Abstract Submitted
for the DPP00 Meeting of
The American Physical Society

Sorting Category: 6.6.2 (Experimental)

Confinement and Stability of H-mode Discharges at Densities Above the Greenwald Limit[1] M.A. MAHDAVI, T.H. OSBORNE, A.W. LEONARD, M.S. CHU, C.M. GREENFIELD, T.W. PETRIE, G.M. STAEBLER, GA, M.E. FENSTERMACHER, LLNL — We have reported observations of gas fueled H-mode discharges with line average densities above the Greenwald limit. In these discharges during the first ∼0.5 s from the onset of gas fueling, the global energy confinement time decreases by ∼20%, but increases back to its pre-puff value in ∼2 s during density ramp up. During the same period the density profile becomes initially hollow, but gradually becomes peaked. Ultimately both the density and confinement increase are clamped by the unset of a 3/2 NTM. The behavior of confinement can be explained by a stiff transport model ($\nabla T_i \sim T_i$) and the evolution of the density profile. As this model suggests, the pressure profile becomes more peaked late in the discharge causing a more peaked bootstrap current. The current profile is further peaked due to a reduction of the edge bootstrap current at high density. The effects of higher pressure and current peaking explain destabilization of the NTM which manifests itself in a cascade of modes m/n = 6/5, 5/4, 4/3 and 3/2. Only the 3/2 mode has a significant impact on heat and particle transport.

[1]Work under DOE Contracts DE-AC03-99ER54463 & W-7405-ENG-48.

M.A. Mahdavi
mahdavi@fusion.gat.com
General Atomics

[X] Prefer Oral Session
[ ] Prefer Poster Session

Special instructions: 11th Oral Presentation in DIII-D Session (to follow Baker)

Date submitted: July 12, 2000 Electronic form version 1.4